

G. killing a couple of deer at Candavilly; G. also nearly added me to the list of killed, for having separated from each other, his rifle-ball passed through the neck of a fine buck, and turning against the spine, glanced over my head.

Leaving the buggy and cart to follow at leisure, G. and I galloped over to Mohomalie, where D., whom you may remember I had left at Karandie, was now stopping. Our friends hardly knew us, soiled and travel-worn as we were, and with beards several inches long. A hearty welcome and a recapitulation of our adventures made the evening fly swiftly, and by daylight next morning we took Her Majesty's mail for Jaffna, from whence I now "wish you heartily farewell."

E. L. LAYARD.

XXXVII.—*A Revision of the Genera of some of the Families of Conchifera or Bivalve Shells.* By J. E. GRAY, Ph.D., F.R.S., V.P.Z.S. &c.

[Continued from p. 44.]

SOME conchologists have been inclined to pay great attention to certain characters in the animal and marks on the Bivalve shell, which the examination of an extensive series shows to be of only secondary importance in some genera and species.

1. The existence and depth of the siphonal sinus in the submarginal scar have been considered of the greatest importance, for it is believed that its depth shows the length, and its absence the absence of the siphons.

When the inflection is very deep, it does show that the animal, as in *Tellinidæ*, has long and retractile siphons, for the inflection is produced by the edge of the fan-like muscle which retracts the siphons; but several genera of *Corbiculidæ* and *Lucinidæ* have well-developed siphons though they have no inflection; but then the siphons of these genera are only contractile, and not withdrawn into the cavity of the mantle by any special muscles.

In some genera with retractile siphons, the length of the siphons and consequently the depth of the siphonal inflections vary considerably in very nearly allied species, sometimes so much so, that the presence of the siphons in several species is scarcely to be discovered. This is the case with certain species of *Chione*, and they thus gradually pass into the genus *Circe*, which have all the other characters of that genus. Yet Messrs. Forbes and Hanley (Brit. Moll. i. 446), on this character, place *Chione* in *Veneridæ*, and *Circe* in the family *Cyprinidæ* with *Astarte* and *Isocardia*.

It may be observed, that there are other families as well as *Veneridæ*, which generally have elongate retractile siphons and deep siphonal inflections, that contain some species which are without

them, or at least have them so slightly developed as not to be distinguished; thus, *Anapa* in *Paphiadæ* agrees with *Paphia* in all the characters except in being destitute of any appearance of a siphonal inflection, but the species of *Paphia* and the other allied genera differ greatly in the depth of the inflection.

It may be remarked, that though some genera of families which generally have a siphonal inflection are sometimes without it, I have not yet observed any genus which appeared to belong to a family usually without any retractile siphons or siphonal inflection, provided with one, and the absence or presence is generally a good family character, but one which must not be solely depended on.

On the other hand, the absence of a (contractile) siphon cannot be considered an unfailing character of a family; for though the genus *Nucula* has, like the other genera of *Arcadæ*, no siphons, yet in *Leda* and *Yoldia*, both so nearly allied to *Nucula*, that some authors have refused to separate them, the one has short and the other long separate siphons. The genus *Lithophagus* differs from other *Mytilidæ* in having united siphons varying in length, but in *L. patagonicus* (D'Orb. Voy. Amér. Mérid. t. 82. f. 24) they are half as long as the shell.

The structure of the siphons appears to be of considerable importance, that is to say, if they are furnished with retractor muscles which have a fan-like end which forms the siphonal inflection on the inner surface of the shell, or are only contractile; but all siphons with or without these muscles are more or less contractile, and, as I have shown in the preceding observations, the size of the retractor muscles appears to decrease until it becomes absolutely wanting in the same family.

2. Some authors regard the entire or partial union and separation of the siphons as of considerable importance, but it is only necessary to look at the figures of the animals of the different genera and indeed species of the same genus of *Veneridæ*, *Solenidæ* and *Mastradæ*, to discover that this is a character of secondary importance, as being exceedingly liable to vary in nearly allied species; nevertheless it is often useful to distinguish those species from one another, and also some groups of genera.

3. The adhesion or separateness of the leaves of the mantle is another character which has been considered by some as infallible, yet the extent to which the leaves are united generally varies in the species of the genera which have this character, as the species of the genus *Solen* for example; but sometimes two genera of the same family have the mantle leaves free and adherent; this is the case with *Mastra* and *Lutraria* of *Mastradæ*. Leach indeed separates the latter from the family and places it with *Mya* on that account, but no one who has studied

the animal and shell with attention can sanction such a separation. Messrs. Forbes and Hanley in the same manner separate *Venerupes* (*Irus*) from *Tapes* for this reason, placing the former in *Gastrochenidæ* and the latter in *Veneridæ*. The adhesion of the mantle leaves also varies in degree in some genera, like *Lutraria*, where they are united when the animal is alive; but separate easily from each other after death or when the animal is preserved in spirits, which is not the case with *Myadæ* and other families.

It is to be observed, that the animals which live permanently in holes in rocks, as *Pholadidæ*, *Gastrochænidæ*, *Saxicavidæ*, or live nearly permanently sunk in the sand on the sea-coast, as *Solenidæ*, *Myadæ*, *Saxicavidæ*, *Corbuladæ*, *Pandoridæ*, *Solenomyadæ*, *Lasiadæ*, or in the sand of rivers, as *Glauconomidæ*, have the mantle-lobes united, leaving only a greater or smaller aperture in front for the passage of the foot.

Secondly, the animals which live sometimes sunk in the sand, and at others move about on the shore, have the lobes free beneath for the more easy movement of the foot, as the *Veneridæ*, *Tellinidæ*, *Macradæ*, *Cyprinadæ*, *Cardiadæ*, *Corbiculidæ*, &c. But the species of those animals which live most in the sand or in holes, as the *Venerupes* of *Veneridæ*, and *Lutraria* of *Macradæ*, and the *Petricolæ*, have the mantle-lobes more united like those of the former group, which they most resemble in habits. *Tapes* and *Venerupes* of the latter group, and some of the former, as *Saxicava*, are often provided with a beard by which they attach themselves to the rocks, when they have been ejected from their holes, or have been cast on places where they cannot form a cavity for their protection.

Lastly, the genera which affix themselves to marine bodies by a byssus passing out between these valves, or by the outer surface of the valves themselves, so that they are always exposed, or which live in holes in coral, like *Pedum*, or sunk head down in the sand, like *Pinna*, with the shell wide open at the top, have the mantle-lobes generally free all round, except at the cardinal, and sometimes on the hinder edge.

The only exceptions to these observations which have occurred to me are in the genera *Chamostrea* and *Myochama*, abnormal forms of *Anatinidæ*, which are attached by the outer surface of one of the valves, and the two very anomalous families of *Tridacnidæ* and *Dreissenidæ*, both living attached by a beard to other bodies, and generally more or less entirely exposed like the last group, but they have the mantle-lobes united like the families of the first category.

Lamarck, Messrs. Forbes and Hanley and others have arranged the families of Bivalves according to the adhesion and separation

of the mantle, beginning with those most united and passing to those most free, overlooking the fact, that the separation and union of the mantle depend greatly on the habit of the animal, and that when the habit of a genus approaches to that of a different family, the mantle agrees more in character with that family than with its normal form; yet these authors would scarcely have arranged the genera according to their habitation alone.

4. The position of the cartilage has been regarded as a character of as much importance for the distinction of families as it is for the separation of genera.

In certain families, as *Paphiadae*, *Crassatelladae*, *Corbuladae*, *Pandoridae*, *Anatinidae*, *Myadae*, *Lasiadae*, *Leptonidae*, *Mactradae*, it is always internal and placed in a particular cavity separate from the ligament.

In other families, as *Veneridae*, *Cardiadae*, *Carditidae*, *Glossidae*, *Astartidae*, *Solenidae*, *Unionidae*, &c., it is always external and marginal on the inner side of the ligament.

But in *Tellinidae* and *Lucinidae*, which have the cartilage generally external and marginal and under the ligaments, some genera have it placed in a triangular internal cavity distinct from the ligament, as in *Amphidesma* and *Loripes*; and have the other characters of the animal and shell so like the typical genera of the families, that it is impossible they can be separated from them. And further, there are some genera in these families where the cartilage is situated in such an intermediate manner, as to be partly internal and partly marginal, so as to form a passage between the above-named genera and those which are of the normal form; showing that in these families the situation of the cartilage is of comparatively little importance except for the distinction of the genera.

A considerable variation in the structure of this part is to be found in the family *Arcadae* and its allies. In *Arca* and *Pectunculus* the cartilage is placed in angular lines on and partly over the beaks. In one genus allied to *Pectunculus* it is placed in a subinternal triangular central cavity. In *Nucula* and its allies it is placed in a regular internal central cochleate cavity, as in *Mactradae*, which has caused those genera to be formed into a family and placed near to it; and in *Solenella* it is external, marginal on the inside of the ligament, and furnished with a rather large fulcrum like *Solenidae*, which has caused that genus to be arranged near this family; yet when the animals of these families are examined and compared, they are found so nearly to resemble each other, that they must be arranged together in one group all characterized by the peculiar pectinated form of their hinge-teeth.

A similar variation is to be observed in the family *Pteriadae*: in *Malleus*, *Baphia*, *Pteria* and *Margaritiphora*, the cartilage is in a single central triangular pit; in *Crenatula* it is divided into several portions, each placed in a separate marginal pit; and in *Melina* it is placed in numerous marginal pits which form cross grooves on the talus of the thickened hinge-margin.

[To be continued.]

BIBLIOGRAPHICAL NOTICES.

Revue et Magasin de Zoologie. Par M. F. E. GUÉRIN-MÉNEVILLE.
Nos. 4-6, April-June 1852. Paris, 8vo.

I. Zoological Miscellanies:—Notices and observations on some Vertebrata new to the Fauna of Provence, by M. Z. Gerbe (IV. pp. 161-174).

These consist of—

1. Notice on *Certhia Costæ*, Bailly, giving an account of the occurrence of this bird in the "Basses Alpes," together with a description of the bird, and a statement of the points in which it differs from *C. familiaris*; this paper is accompanied by a plate (pl. 8) showing the characters of the two birds.

2. Observations on *Strix Tengmalmi*, Gmel., stating that this bird is common in the mountains of Provence.

II. Note on a new European species of *Hippolaïs*, by M. Z. Gerbe (pp. 174-175). Of this bird M. Gerbe gives the following character:—

Hippolaïs pallida. H. supra pallide griseo-olivacea, subtus ex albo flavescens; oculorum ambitu superciliisque sordide flavescens; remigum secundus sexto brevior; rectricibus duabus utrinque extimis margine interno albidis.

Colore et conformatione cum *H. elæica* convenit; ab illa autem discrepat magnitudine, qua eam antecellit, longitudine rostri, alarum, caudæ, remigumque proportione.—Hab. in Hispania.

III. Descriptions of three species of *Rodentia* belonging to the genus *Arvicola* (VI. pp. 257-270). This portion of the paper contains only the description of one species (*A. leucura*), the character of which was published in the last Number of the 'Annals.' A coloured figure of this animal is given on pl. 11 of the present volume of the 'Revue et Magasin de Zoologie.'

IV. Monograph of the family of *Torpedinidæ*, &c., by M. Aug. Duméril (IV. pp. 176-189; V. pp. 227-244; and VI. pp. 270-285).

The author commences by observing that but few animals are furnished with an apparatus for the production of electrical phænomena, and that these are all fishes. Those in which the existence of these organs has been ascertained are the fishes forming the family *Torpedinidæ*, of which M. Duméril here describes seventeen species, the